

**GALACTOGOGUES
AND
BREASTFEEDING**



RESEARCH UNIT
COLLEGE OF HOME SCIENCE
NIRMALA NIKETAN
49. NEW MARINE LINES
MUMBAI - 400 020
1998.

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Preface

International code of marketing of breast milk substitutes recommended by WHO in 1981 has been instrumental in promoting and emphasizing the merits of breast feeding the world over.

Our grandmothers managed to breast feed as long as three years. Our rural mothers still do so inspite of poor nutritional and hygienic standards. How did - and do - they manage? Surely, they knew and know - a lot about the value of breast-feeding. Today's mothers in urbanized and industrialised societies have to rediscover this knowledge.

This little monograph is an outcome of the seminar on "Galactogogue and Breast-Feeding" held by the Department of Foods & Nutrition in the College of Home Science, Nirmala Niketan, Mumbai during the breast-feeding week (3rd August '98). The experts in the field focused their lectures on answering the following issues:

- ◊ What are galactogogues?
- ◊ Are our grandmother's practices and remedies mere myths or proved facts?
- ◊ Are there any galactogogic concepts in Ayurveda?

We have tried to document the essence of the expertise and experiential knowledge of the experts for the benefit of all others.

Views expressed in this monograph are those of the authors.

Antoinette Araujo.

CONTENTS

I. INTRODUCTION	G. Subbulakshmi
II. PHYSIOLOGY OF LACTATION	Y.K. Amdekar
III. AYURVEDIC CONCEPT OF LACTATION	U. M. Thatte
IV. GALACTOGOGUES IN THE TEXT OF AYURVEDA	K. D. Dhuri
V. HERBS AND SPICES AS GALACTOGOGUES	G. Subbulakshmi N. Sahani & S. Karande
VI. 'SATAVARI' – A GALACTOGOGUE	K. M. Parikh
VII. GARLIC AND METHI AS GALACTOGOGUES	N. Sahani, S. Karande & G. Subbulakshmi
VIII. MODERN DRUGS AND LACTATION	V. Salvi
IX. CUES AND QUERIES ON LACTATION	G. Subbulakshmi & A. Hegde

INTRODUCTION

- G. Subbulakshmi.

India's cultural and medical heritage is very ancient. Our unparalleled books of wisdom in all aspects of philosophy and science and the four *vedas* are dated 5000 B.C. '*Atharva Veda*', the third *veda* has a section on the medical science called *Ayurveda*.

Ayurvedic text has been available in the form of the three big ancient treaties (600 - 500 B.C) viz., the *Samhitas* of the Charaka (a book on medicine), *Sushruta* (a book of surgery as well as all other aspects of the medical science) and *Vagbhat* (mixed)

as well as several later smaller works and the various commentaries on these.

Ayurvedic classics have described the entire subject of maternal and child health under "*Kaumarbhritya*", giving importance to the child over a mother. Worth mentioning are specific dietetics, and modes of life advocated for women during menstruation, ovulation, antenatal, natal and post-natal period, along with detailed physical examination of the new born, assessment of growth and development of child and its

immunization. Some foods were considered as abortifient if consumed during pregnancy and some were considered as good for development of the foetus. Similarly, some foods were considered as helpful in promoting lactation by improving the secretion and flow of milk. But unfortunately, the scientific and technological advancement has curbed quite a number of these practices for various reasons. The present generation questions on these beliefs for proof and evidence before accepting them as facts. Thus, the old practices are being rejected as superstitions and food fads and fallacies by the younger generation. Hence there is a risk of

extinction of age old wealth of knowledge.

Breast-feeding is the traditional and near universal infant feeding practice in our country. However, now the subject has acquired a great importance and relevance in recent times through WHO declaration of the breast feeding week. There is an overall decline in the duration of breast feeding from 70 % in 1974 to 48.4% in 1984 amongst mothers who breast feed their infants till one year (Walia et al., 1987) which might have gone down still further in these fifteen years. Timely intervention of the WHO in introducing the breast-feeding code on

scientific grounds has in turn helped in reviving our age old practices.

Traditional superstitions, which have existed in a society for ages, may have a magical or practical origin. Knowing the importance of breast-feeding, the grandmothers were wise enough to stress upon certain specific foods/ herbs/ spices and condiments. For example, *methi ladoo* is believed to improve lactation in Gujarat and Maharashtra, while garlic and betel leaves in the South. In some of the tribal communities omum powder (*trachyspermum ammi*), *pippali* juice (*piperlongum*) and gingerly oil are believed to be beneficial in lactation (Vimala & Ratnaprabha, 1987). These

tribals follow an unusual food practice to initiate and improve lactation performance i.e. even in complete lactation failure, an earthworm ground in a smooth paste mixed with *dal* is given to the lactating mother without her knowledge. A small live fish swallowed by the lactating mother is believed to counteract decrease in breast milk secretion (Vimala & Ratnaprabha, 1987). A thick nutritious traditional beer called "tella" which is a good source of folate and Vitamin B12 is not only permitted but encouraged during lactation in Ethiopia (Gebre-Medhin, 1980). Similarly, in Indian tribal women solid food is not

permitted for the first three days after delivery.

There is so much variation between cultures and between individuals that these superstitions need scientific evaluation. If such practices are proved beneficial then they may be encouraged and those which have not been probed into may be left undisturbed. But definitely, the beliefs and practices when proved harmful ought to be discouraged.

Superstitions are perpetuated by understandable human conservatism. It is very painful for the communities to accept new ideas. It is indeed wise to be suspicious of new ideas as new

ideas may not necessarily be good ones. So the whole wilderness of ideas about breast feeding, both traditional and modern, need critical examination and revaluation.

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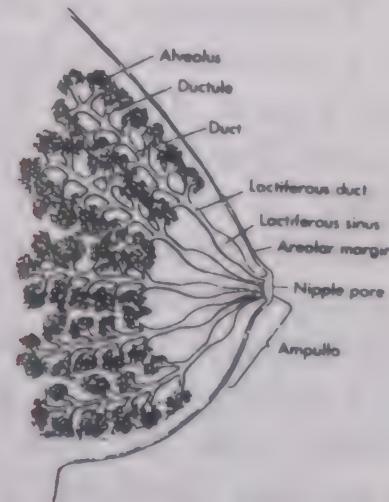
PHYSIOLOGY OF LACTATION

-Y.K. Amdekar

The mammary glands prepare for lactation through a series of developmental steps that occur during adolescence and pregnancy. The principal feature of mammary growth during the prenatal phase is increase in the size of the alveolar ducts under the stimulation and influence of oestrogen and progesterone. Further in pregnancy (i.e. around 5 months) the lobules of the alveolar system maximally develop and small amounts of colostrum may be secreted. This means that milk secretion begins at 5 months, but since there is no need for

milk secretion till term it does not occur.

Figure 1: Anatomic features of the mammary gland



Source: Mahan and Arlin, 1992

Delivery of the infant brings about a dramatic change in the hormonal levels of the mother. There is a precipitous fall in the oestrogen and progesterone levels accompanied by a rapid rise in the secretion of prolactin. These changes and others set a stage for formal onset of lactation.

The typical stimulus for milk production and secretion is the suckling of the infant at the mother's breast. Nerves beneath the skin of the areola send a message via the spinal cord to the hypothalamus which in turn transmits a message to the pituitary gland, where both the anterior and posterior areas are stimulated to release their respective hormones. Prolactin

from the anterior pituitary ultimately stimulates milk production by alveolar cells in the mammary tissue. Oxytocin from the posterior pituitary gland stimulates the myoepithelial cells of the mammary gland to contract, causing movement of milk through the duct system and lactiferous sinuses into the mouth of the infant. This latter process is referred to as "let-down".

This process of lactation is very natural and occurs in all women with a very few exceptions. These exceptional cases occur in conditions of insufficient glandular tissue in the breast or prolactin deficiency. Both are extremely rare.

However, there are many reasons due to which lactation failure may occur.

- Stress and anxiety
- Delayed initiation.
- Failure of frequent suckling and complete emptying of the breast.
- Introduction of prelacteal feeds.

Lactation is a natural reflex given to women by nature. But the maintenance of this reflex depends on them.

LACTATION INITIATION IS AN ENDOWEMENT AND MAINTAINANCE IS AN EFFORT

If the milk is not expressed properly, adequate milk flow becomes difficult. Hence, suckling or emptying of the breast becomes important. In the absence of adequate suckling, there is a reduction in prolactin and there is atrophy of the glandular tissue.

Therefore, women are encouraged to breast feed as frequently as the baby wants. This will help in increase of milk production and successful lactation.

In some cases where the baby is premature and sick and is not able to suck, emptying the breast is done either mechanically or manually.

**REMEMBER COMPLETE
EMPTYING OF THE BREAST FOR
EFFICIENT LACTATION IS VITAL**

■ Delayed Initiation

It has been proved by scientific documentation that the baby should be put to the breast within the first 20 minutes after birth, as this initiation stimulates hormonal production. Hence, the baby should be cleaned, made warm and then put on the mother's breast. Even in caesarean cases an attempt is made to familiarise the baby with the mother within 2-3 hours.

**NEED FOR EARLY INITIATION
CANNOT BE IGNORED**

■ Stress & Anxiety

Post-partum period can be one of the worst time for the new mother because there is a sudden drop in all the hormones of pregnancy to zero. Thus, the mother may undergo post-partum blues. She may start becoming restless and could experience mood swings. These minor emotional disturbances could influence the 'let-down' process as the circulating oxytocin levels are sensitive to any small disturbances.

The mother may get panic thinking that she is not producing sufficient milk the first two days after

the delivery. Here the mother has to be made to realize that she is going through a perfectly normal physiological state and that lactation will be established after some days.

Post-natally there is very little secretion of milk (about 20-30 ml.) and this secretion is called colostrum and is the most important gift given by the nature.

Remember, that milk secretion does not occur for first two days after birth simply because the baby does not need it. The new-born just requires 20-30 ml/day in the first 48 hours. This is because the new-born is born with water in the body and hence does not

need extra water or supplements for the first 2-3 days

In conclusion, it is understood that any mother educated or uneducated, poor or rich is able to go through the physiological stages of pregnancy and lactation with the nature's blessings.

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AYURVEDIC CONCEPT OF LACTATION

-U. M. Thatte

Ayurveda (*Ayu* = Life, *Veda* = Science) the science of life, is based on the concept of “*Panch Maha Bhooth*” (Air, Space, Earth, Fire, Water) which in their different combinations impart their qualities to the specific components of the body viz. *dosha* (humeurs), *dhatus* (tissue), *mala* (metabolic end product).

The three *doshas* have the following properties:

Vata Dosha: *Vata* is the superior most of the *doshas* and is very light and windy. It controls the movements of

the person. For instance, in Parkinson’s disease the person’s movement and gait are affected due to vitiation of *vata dosha*. The *vata dosha* also controls the movement of the sperm towards the ovum. Besides lack of sleep and gastro-intestinal abnormalities are considered to be due to altered *vata dosha*. It is understood that as people grow older the *vata* component in their body increases.

Pitta Dosha: This is a physical *doshas*. It is like a fiery upwardly mobile executive. This controls the digestive

metabolic and enzymatic responses of the body. The *pitta dosha* is more dominant in young adulthood.

Kapha Dosha: This is a physical *dosha* which is known as a gentle arbitrator and a synthesiser. It is heavy and contributes to the development and growth of the person. It is more dominant during the childhood phase of an individual.

Based on the predominance of a particular *dosha* the person has a particular '*prakriti*' or constitution.

This constitution contributes to health and the way you interact with the environment.

Characteristics of people with different '*prakriti*':

Vata Prakriti:

The individual with this *prakriti* is quick, moving fast, always in a hurry, and restless.

Pitta prakriti

The individual with this *prakriti* is known to be slightly plump, very intelligent, aggressive, ambitious and a good orator.

Kapha Prakriti

The individual with this *prakriti* is known to be calm, quiet and does not get affected very easily with small

tensions in life and hence lives the longest.

Dhatu:

Dhatus are the tissues and lowest in the hierarchy.

Mala:

Mala is the end product of the tissue metabolism - an excretory product.

Importance of Dhatus

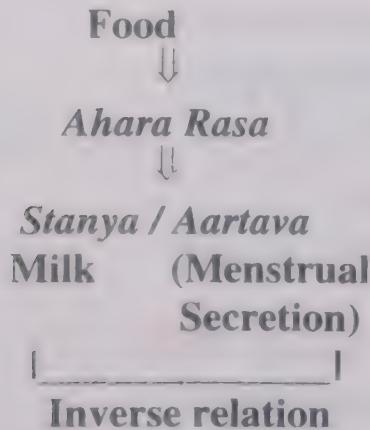
Rasa dhatu, the plasma or the blood is the highest *dhatu* in the hierarchy, while *shukra dhatu*, the

germinal epithelium or the ova is the simplest tissue.

All these *dhatu*s in turn have *upadhatus*. For example; breast milk and menstrual fluid are the *upadhatus* of the *Rasa dhatu*.

Understanding these concepts is important, because, according to *Ayurveda*, milk originates from the food. The food is converted into the *Ahara Rasa*, which on absorption goes to the *rasa dhatu*. *Rasa dhatu* has two *upadhatus*, as mentioned earlier - milk and menstruation, which are in inverse relation to each other. As the menstrual secretion goes down post-delivery, the milk secretion goes on

increasing. Hence, in the field of *Ayurveda* *Ahara rasa* is given a lot of importance.



Thus various galactagogues and drugs are also considered to be combinations of various foods. Charak has looked at them as two sides of a coin and says

that dietary substances are just less potent drugs and actual drugs are more potent diets.

Influence of diet and doshas on “stanya”

Good quality milk is judged by the taste, consistency and the feel. Milk of a good quality will completely disperse in water.

Abnormality of milk is mainly caused due to the diet. For instance, strong flavour of mango appears in the milk when the mother eats mango during the lactating period. This flavour can be the cause of dislike for the child and thus affecting further milk intake. Hence, one has to be

careful about one's diet during pregnancy and lactation.

The *prakriti* and *doshas* also determine and influence the quality of mother's milk. Mother with vitiated *pitta dosha* will secrete milk which is coppery, astringent, bitter and leaving a typical odour. Mother with *vata dosha* abnormalities produces frothy, sour and thin milk which floats in water while mother with *kapha* dosha vitiation secretes sweet milk which smells oily and sinks in water.

The following are known to have effect on the milk secretion and its quality, when given either during

pregnancy or after delivery. Diets known to improve lactation are also given below:

During Pregnancy

- medicated ghee
- decoction of *Sida theophratus* (Bala)
- *Mandur Bhasma*

Diet to improve quality milk

- Barley wheat
- Specific type of rice, pulses
- Vegetables
- Liquors
- Garlic

Drugs to improve quality of milk:

Decoctions of:

Patha

Cisseplalus

Sunthi

pareira

devadaru

dry ginger

nagarmotha

daruharidra

murva

Cyperus rotundus

ginger

Clematis triloba

Guduchi

gouriana

Indrayava

Zinziber

Kutukarohini

officinalis

Tinospora

cordifolia

Seeds of

Hollorena

antidysenterica

Picrorrhiza

kurroa

Kade chirayet

Sariva

Swertia chirata

Hemidesmos

indicus

Foods which increase quantity of milk:

- Wines
- Vegetables, Cereals
- Meat
- Liquids (sweet, sour and salt tastes)
- Milk
- gum arabic
- *ahaliva*
- infusion/ supari of
“*owa, methi* (fenugreek seeds),
badishep (saunf), *lavang*
(clove), *ginger*”

Galactogogues (to increase volume)

- roots of *virana* *Andropogon muricatus*
- *sastikasali* type of rice (reddish)
- *iksuvalika* sugar cane
- *darbha, kusha* *Desmostachya bipinata*
- *kaasha* *Saccharum spontaneum*
- *nagarmotha* *Cyperus rotundus*

In today's jet-setting, pill-popping age a re-look at Ayurvedic concepts of lactation brings a breathe of fresh air. The wisdom so deeply rooted in our tradition deserves to be re-visited and investigated to give our new-borns a better life on this planet.

GALACTOGOGUES IN THE TEXT OF AYURVEDA

- K. Dhuri

Thousands of years back, Vagbhat said,

मातुरेव पिबेत् स्तन्यं तत् परं देहवृद्धये।

(Va. 3/1)

This goes on to show that breast feeding was given due consideration in our culture but was not a topic of discussion until WHO proclaimed the importance of breast feeding to the world.

Similarly, there are so many hidden treasures in *Ayurveda*, the most ancient science of life; which help us in fighting against the disease and in maintaining health. With hundred years of background in research and development, the science of *Ayurveda* has brought a variety of old age herbal remedies into practise.

The excerpts of the following verses from Sanskrit literature depict the focus laid on maternal and child nutrition as well as herbal and household remedies, for failure of breast-feeding and also as an enhancer of lactation (Galactogogue).

द्वे स्तन्यं स्त्रियं वहतः स्तनसंश्रिते।

Su.sha.9/5

पुस्त्रेभ्योऽधिकाधान्ये नारीणामाशयरप्रयः।
धरा गर्भाशय प्रोक्तौ स्तनौ स्तन्याशयौ मतौ।

Sharangdhar I - 5 / 10

स्तन्याशयौ क्षीराशयौ.... Gudharthdipika

The two breasts in females help in production & circulation of breast milk.

यत् स्तन्यं जनयाति तत् स्तन्यं जननम्।
नार्यरत्नं स्तन्यं मधुरं स्निधं कषायानुरसं।

(Sushrut Su.45)

Human milk is Sweet, Slimy, Emollient And Astringent.

Five *agnis* pertaining each to *Prithvi*, *Ap*, *Tejas*, *Vayu*, *Akash* digest the respective fractions of food. During the process of metabolism, the *dhatus* supporting the body undergo two fold conversion , excretion(mala) and essence (*prasad*). This essence or *Prasad* is acted upon by the respective one of the seven *agnis* to form seven *dhatus* as *Rasa*, *Rakta*, *Mamsa*, *Meda*, *Asthi*, *Majja* and *Shukra*.

रसात् स्तन्यं

धातूनां पोषण अभिधाय उपधातुनां पोषणम् ।
इत्याह। रसात् स्तन्यं प्रसादजं ॥

Rasa *dhatu* of these nourishes *Stanya* i.e. breast milk. *Rasa* *dhatu* is of *kapha* origin, and thus in condition of *stanyakshaya* (reduction of milk); *kaphavardhaka* - drugs have been suggested.

Factors affecting Lactation

क्रोध शोक वात्सल्यदिभिश्च स्त्रियो स्तन्यनाशो भवति।

Krodha — Frown

Shoka — Miseries → Mental Status
Lack of Sound sleep

Chinta — Tension

Vatsyalabhab — Absence of love towards baby

Ativayayam — Overexertion — Physical Stress

Deergha Vyadhikarshan — Weakness due to chronic disease — Nutritional status

All these affect prolactin and sex hormone levels and this in turn reduces milk secretion.

सत्त्वजनन गण : Galactagogues as mentioned earlier, is an agent that improves milk secretion and there are some substances which purify the breast milk, according to the *Ayurvedic* literature.

स्तन्यसमानानि द्रव्याणि सामान्यात् स्तन्यं वर्धयान्ति यथा गव्यक्षीरं,

सारिवा Hemidesmus indicus,
शतावरी Asparagus racemosus.

रसात् स्तन्यं प्रजायते।

तस्त्रात् रसवृद्धिकराणि द्रव्याणि रतन्य वर्धयान्ति।

- यथा शालिषष्टिक दर्भ तुण्पंचमूलानि च।

- आनुपजात्त्वं रसाः।

सर्वशरीरधातुवर्धकानि द्रव्याणि स्तन्यजननानि भवन्ति।

यथा द्राक्षा	Vitis Vinifera
मधूक	Glycorrhiza glabra
गोधूम	Wheat
शालिषष्टिक	A Type of Rice
	जीवनीय गण औषधी (Sushrut Su.4)
	Same as काकोल्यादि गण by Sushrut

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यथा शालिषष्टिक दर्भ तुणपचमूलानि य।

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	Same as काकोत्यादि गण by Sushrut

All “Rasas” and “Ganas” that increase the milk production have been listed in these stanzas.

स्तन्यसंश्रिताना सिराणां विवृत्तत्वात् स्त्रीणां
स्तन्यं प्रवर्तते। तत्र कानिचित् द्रव्याणि
गर्भाशय संश्रितानां सिराणां अप्रसरणं
स्तनसंश्रितानां सिराणां तु विवरणं कृत्वा स्तन्यजननानि भवन्ति।

यशा कार्पासमूल

Gossypium herbaceum

पिघली

Piper Longum

पिघलीमूल

These galactagogues in addition to increasing the milk secreted, also help in contraction of uterus.

स्तन्यशोधन गण : Galactopurifiers: these are agents that purify breast milk.

दुष्टं स्तन्य शोधयति तत् स्तन्यशोधनम्।

Vatadushta

Pittadushti

Kaphadushti

Dashmool

Gaduchi

Tinospora Cordifolia

Shunti

Zingiber

officinale

Shatavari

Asparagus racemosus

Katvi

Picrorrhiza

Kurroa

Sariva

Hemedesmus indicus

Devdaru

Cednes

devdara

Chandan

Santalum album

Nimba

Azadiracta indica

For common infections:

<i>Dhanvayas</i>	-	<i>Fagonia cretica</i>
<i>Patha</i>	-	<i>Cissampelos Pareira</i>
<i>Tikta</i>	-	<i>Picrorrhiza Kurroa</i>

पाठाशुंटयमृतातिक्त तिक्ता देवाहसारिवा।
समुत्तमूर्वेदंयवा स्तन्यदोषहरा परम्।

(Va. 3- 2 /25)

मातृस्तन्याऽभावे धात्री -

समानवर्णा मध्यम्बया शुचिः अलोलुपा....

स्तनाऽभावे पयः छागम्...।

(Va. V-1 / 40)

In case the mother is not permitted to breast feed the child due to infections, then a nurse was recommended even in those days. In absence of nurse, goat's milk has been suggested.

अल्पक्षीरत्वे वातदोषेन।
अल्पक्षीरस्य दोषेण संभवेद् अवाक्सुतः।
अल्पसत्त्वं कृशः दीनं श्वासाऽतिसारं पीडितः।

Harita Tritiya 541-548

Lactation failure is a condition which may arise due to “*Vata dosha*”. In such cases the baby loses weight, becomes mentally and physically unsound and restless (PEM). Resistance to infections is also affected (lack of immunity) and baby becomes susceptible to many infectious diseases such as diarrhoea, respiratory problems etc.

Thus breast milk increases “*Vyadhikshamatva*” i.e., not only resists the disease but also helps in curing existing disease.

HERBS AND SPICES AS GALACTOGOGUES

- G. Subbulakshmi, N. Sahani
& S. Karande.

Traditional medicines may be beneficial but because of lack of well designed scientifically validated studies, the western and modern concept of treatment has gained precedence (Khanna, 1982). In order to ensure the safe effective use of traditional medicine, WHO supports research and training activities. There are now 24 WHO collaborating centres for traditional medicine conducting research on herbal medicines.

WHO strongly supports the further promotion and development of the rational use of traditional medicine throughout the world (Zhang, 1996).

India is endowed with a rich and varied flora due to its wide range of climatic conditions. These plants as a gift of nature have been incorporated on the traditional systems of medicine for many common ailments (Vashist, 1987).

In the ancient Indian system of medicine, diet therapy has been used as a valuable aid in medico therapy (Nadkarni, 1982). Bhagwandas (1989) has stated that "Foods act in the body through the influence of their dominant properties". Food is important from the nutritional point of view as well as medicinal point of view. When medicinal aspects of foods are considered, home remedies come into the picture. Through the ages India's myriad herbs, spices and plants have played a great role in the accumulation of ancient medical knowledge. By observation, experience and trial our ancestors have accumulated knowledge on the properties of plant life. For

most common ailments simple home remedies are available, and they can be easily prepared using simple kitchen ingredients. Foodstuffs that are commonly used in the daily diet, many a times play a role as medicine (Khanna, 1982).

According to Saini et al (1990) in the developing countries, the average volume of breast milk yield is only 30 to 80 ml., less than that of the women in the developed countries, whose average daily milk yield is 750 ml. and this value may be further enhanced if accurate methods of estimation are employed. Racial differences in yield of breast milk have been generally denied.

Since breast milk is the only source of nutrition for the infant in the first few months of life, it is very important that the mother produces sufficient milk, which will determine the growth of the infant. Therefore, supplementation of the nursing mother's diet with foods, which are believed to increase milk secretion, is a traditional practice in our country. These foods are referred to as 'galactagogues'. Almost all communities in India supplement the mother's diet with some kind of galactagogues.

Sushruta (1938) has described some herbs which increase the milk yield. *Sharma* (1954) has listed some

condiments which are galactagogues. *Cuminum cyminum* (cumin seeds) has been described as a galactagogue by *Sushruta* (1938) and *Nigella Sativa* (black cumin) by *Charak* (1941).

Khanna (1982) reports that garlic is administered to improve milk secretion. It is an anti-fertility drug showing oxytocic activity (*Chopra*, 1958). Cottonseed decoction obtained by boiling a tablespoonful of seeds in a glass of water helps to increase flow of breast milk (*Khanna*, 1982). Crushed seeds of *methi* are also commonly used as a galactagogue. The seeds of *methi*, are made into gruel and given as a diet to increase the flow of milk (*Nadkarni*, 1982). Some lactating women who are

interviewed in Gujarat, were found to consume 'methipak' which is made of wheat, fat, jaggery and fenugreek in a dosage of 150 gms. per day (Subbulakshmi, 1990). Raman (1986) reports that in most regions, it is customary to feed the nursing mothers additional amount of fat (ghee) which supplies energy and Vitamin A or some special preparations (*lahia, ladus* of *methi, mung*, garden cress seeds) which are source of protein, iron, calcium and Vitamin B. Gingelly ladoos made with jaggery with their high protein and fat content act as nutritional supplement during lactation (Khanna, 1982). Some of the traditional foods included in the

nursing mother's diet in Maharashtra are garden cress seeds kheer (haliv kheer), dry coconut and ajwain (Omum), gum ladoos (dinkache ladoo) (Mudambi, 1993).

In a study conducted to investigate the effects of garlic ingestion by the mother, it was revealed that the same significantly and consistently increased the perceived intensity of the milk odour. This increase in odour intensity was not apparent 1 hour after ingestion, peaked in strength 2 hours after ingestion, and decreased thereafter. The nursing infant detected these changes in mother's milk and it was suggested by

the finding that infants were attached to the breast for longer periods of time and sucked more when the milk smelled like garlic, thus there was a tendency for infants to consume more milk as well (Mennella and Beauchamp, 1991).

Although certain traditional foods are believed to have a galactogenic effect, the process of lactation is an interplay of several factors, which affect the milk output.

Sosa et al (1976) demonstrated a rapid increase in milk production in malnourished Guatemalan women following a diet, improved particularly in Calories and protein. In a study on Nigerian women, Edozien et al (1976)

reported that the lactating women in that community had a low breast milk output which was related to their dietary protein intake. It was indicated that an increase in dietary protein intake of the poor women produced an increase in the volume of breast milk. Supplementing the Indian lactating women's diet with extra Calories and protein as recommended by I.C.M.R. also was found to increase the milk yield (Subbulakshmi, 1980).

The innumerable folk medical traditions, still widely undocumented are often closely related to the traditions of *Ayurveda* (Laping, 1987). The Indians have practised the *Ayurveda* system of medicine since

thousands of years. The *Ayurveda* claims that special drugs designed by them result in increased milk production and help in growth of infant (Raman, 1986). There are many *Ayurvedic* drugs being marketed by various pharmaceuticals or which are advertised widely through media highlighting their various benefits.

Leptadania reticulata (jeevanti)

A number of studies have been carried out on the galactopoietic property of the plant on laboratory animals in the veterinary as well as clinical practice. A compound herbal preparation (Leptaden) comprising extracts of two plants viz. *Leptadania*

reticulata and *Breynia patens* showed lactogenic effects on sixteen buffaloes with deficient lactation (Anjaria et al, 1975a).

Many investigators have clinically assessed the lactogenic effect of *L. reticulata*. These studies have been carried out on the commercial preparation of Leptaden. The efficacy of Leptaden as a galactogogue was quoted by Trivedi (1956). Deshpande and Ashar (1962) found 2 tablets of Leptaden to stimulate lactation within six to ten hours in milk deficient women with no side effects on the mother or the child. This drug has both galactogenetic and galactopoietic actions. On the other hand, 10 tablets

twice daily, given for fourteen days to cows increased milk production only after 24-36 hours. No deleterious effect was detected (Murthy, 1969).

In another study, Leptaden from third to seventh day could stimulate lactation in women with lactation failure. Even after withdrawal of the drug, lactation could be maintained for two to six months (Gokhale, 1965) Gupta and Nandkishore (1966) administered Leptaden tablets to women with deficient lactation. Those who were administered ante-natally responded well, some had inadequate lactation and some did not respond. Kothari and Kothari (1972) showed that routine administration of Leptaden

was effective in decreasing the number of cases of lactational failure.

According to Akthar and Sitaratna (1972), 50 gms. of Leptaden, administered post-natally in a series of women with hypogalactia produced milk flow within 24-96 hours of the therapy in 75 percent women and led to satisfactory increases in weight of babies. Lactation continued even after the treatment was stopped.

In a study in Karnataka, 86 percent of women showed good response and 13 percent poor response after Leptaden administration (Rao and Devi, 1977). Out of 50 women, 38 women showed improvement in milk secretion after Leptaden

administration. Leptaden increased the quantity of milk flow in 91.4 percent women in a study carried out in Gandhi medical College, Bhopal. The mean increase in the weight gain of infants was 31 gms (Bhandari and Soni, 1979). Although the mode of action of Leptaden is not known, many scientists have unquestionably proved the lactogenic effect of this drug.

Lactogenic effect of stigmasterol and other fractions isolated from *Leptadania reticulata* were studied in lactating rats. On consideration of results on pup weights, body weight of mother rats, photo micrographic studies on mammary gland and secretory rating, it

was concluded that the lactogenic effects of Leptaden is due to its component *Leptadania reticulata* (Anjaria et al, 1975b).

Nigella sativa

In *Nigella sativa*, the galactogogue principle was found to occur in the ether extract of the seed which at a concentration of 1.8 percent showed a more powerful galactopoietic effect than that induced by 0.5 mg. of oestrogen injection given daily to lactating rats. Histology of lactating breast tissues confirmed the enhanced secretory activity on a diet of ether extract of *N. sativa* and oestrogen (Agrawala et al, 1968).

Lactare

Capsule Lactare contains herbal ingredients, which are traditionally used in the community for improving lactation and well being of puerperal women.

Each capsule of lactare contains:

hatavari (*Asparagus racemosus*) 200 mgs.

shwagandha (*Withonia somnifera*) 100 mgs.

Jeshtamadh (*Glyceriza glabra*) 50 mgs

Methi (*Trigonella foenum graecum*) 50 gms.

Lasun (*Allium sativum*) 20 mgs.

When two capsules of Lactare were administered thrice a day to

women with complaints of scanty milk, the mothers showed a marked improvement in milk output after consumption of 18-24 capsules. No untoward side effects were noticed in baby or mother (Sholapurkar, 1986). All the substances used in the preparation of Lactose as per traditional knowledge in the community, have been given individually or in combination with other substances for the well-being of women and for improving lactation and quality of milk and are safe for the mother as well as the baby. They possess antispasmodic, soothing, laxative properties and also help digestion.

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SATAVARI - A GALACTOGOGUE

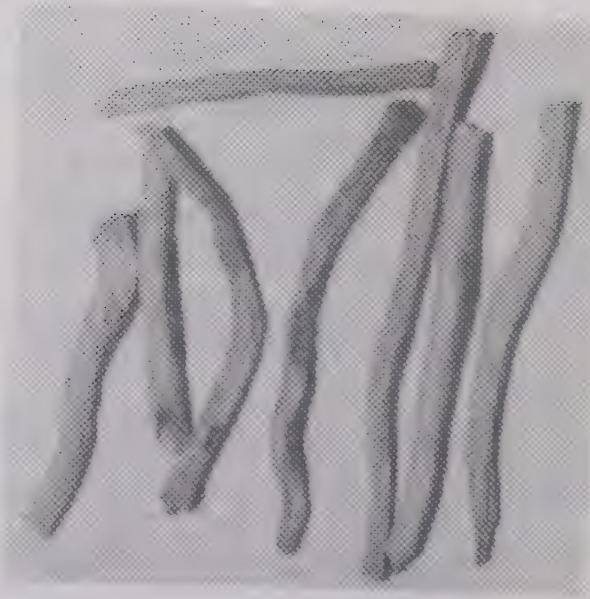
-K. M. Parikh

Lactogenesis was a subject of speculation till the historic discovery by Stricker (1929) and Grueter (1928) of the anterior pituitary lactogenic hormone, Prolactin. This gave a fresh impetus to explain the initiation of copious milk secretion at parturition. The discovery of the hormone led to hopes that the anterior pituitary hormone might be useful in the treatment of hypogalactia in the parturient woman. Though large dose of oestrogen and Progesterone are used to suppress lactation there was no known drug which could stimulate

galactogenesis till 1972. But now a number of herbs have been identified and used in *Ayurveda* as lactation promoting substances.

Satavari (*Asparagus racemosus* wild) has been classified as a powerful "Rasayana" in *Ayurveda* and its use as medicine dates back to *Rigveda* and *Atharvaveda*. *Satavari* is a multi-purpose medicine in *Ayurveda* as it is believed to improve mental as well as physical strength and youthfulness in addition to its healing properties in a variety of illnesses including cancer.

Satavari is a thorny climber with needle like *cladodes* which can be grown easily anywhere in India. As any other medicinal herb, *satavari* also grows well in Northern India and quite well distributed along the western coast in Palgar -Bordi area of Thane district. The roots of this plant are used extensively in local traditional health drugs as well as in Ayurveda. *Satavari* is known as *Satavri* or *Shatamuli* in Hindi, *Shatali*, *Kilavari* or *Tannirvittan Kizhangu* in Tamil, *Satavari* in Malayalam, Marathi and Gujarathi, *Callagadda* or *phillitega* in Telegu and *Majjige gadde* in Kannada.



ASPARAGUS RACEMOSUS Willd

The constituents of the root has been found to be pyrrolidine, alkaloid, sapogenin, shatavarin, saponin, protein, lipids and steroids.

The properties have been described as

Rasa - *Madhura* (sweet), *tikta* (bitter)

Guna - *Gutu* (heavy), *Snigdha* (unctuous)

Veerya - *Sheeta* (cold)

Vipaka - *Madhura* (sweet)

Satavari is considered to be one of the “*divyaoushadis*”. It is a drug which has to be always used fresh.

Parts used are tuberous roots and tender leaves.

The therapeutic action of *Satavari* have been described as ‘aphrodisiac’ (*vrasya*), rejuvenative (*rasayana*), galactogogic (*stanyakara*), toxicifying (*balya*), improving intellect (*medhya*), increasing digestive power (*agnikara*), nourishing (*pushtikara*) and improving vision (*netrya*). It combats *vata* and *pitta* (*vatapittahara*) and works as a component of blood tissue (*raktadhatu*) and reproductive tissue (*sukradhatu*). It is effective in emanciation (*kasya*), oedema (*sopha*), tumor like manifestations (*gulma*) and diarrhoea (*atisara*).

Satavari is included in *Balya gana*, *prajasthapana gana*, *gurbhasthapana gana*, *madhura varga* by *Charaka Samitha*, *Vidariganahadigana*, *Varunadigana*, *Kanataka pancamula* by *Susruta* and *Jivaniya panchamula* by *Astanga Samgraha*.

Satavari is used as an uterine sedative, in conditions like schistosomianis, gastric ulcers, inflammatory conditions, impotency, liver complaints and as a galactogogue.

Various properties of *Asparagus racemosus* have also been scientifically studied. They include antispasmodic, cardiotonic, cytotoxic, antifungal, uterine relaxation,

estrogenic, anti-inflammatory, immunostimulant, antileucopenic, analgesic and anti-ulcer activities (Unnikrishnan, 1998).

It was also seen that the crude alcoholic extract of the roots increased the weight of mammary glands in the post partum and oestrogen-primed rats, and the uterine weight in oestrogen-primed group. The increase in the weight of adrenals coupled with the depletion of ascorbic acid suggested the release of pituitary ACTH. Oestrogen-primed rats receiving the extract showed well developed lobuloalveolar tissue with milk secretion. The mechanism of action of the extract may be through a direct

action on the mammary gland or through the pituitary or pituitary-adrenal glands, due to the secretion of prolactin and ACTH (Sabnis et al., 1968; Jetmalani et al., 1967).

In a veterinary study, the roots of *A.racemosus* have been found to have galactogogic action in buffaloes in which the milk yield was found to be significantly increased after the use of the drug (Patel and Kanitkar, 1969).

The alcoholic extract of the aerial parts of *A.racemosus* showed anti-cancer activities in human epidermal carcinoma of the nasopharynx in tissue culture (Dhar et al., 1968).

Few self-help techniques:

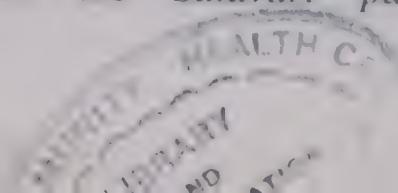
- ⇒ For internal haemorrhage milk processed with *satavari* and *goksurā* is uscful. This is specially useful in the haemorrhage in the urinary tract. This can also be taken in case of *dysuria*. Dosage: 60 -75 ml. twice daily.
- ⇒ In *vatarakta*, a decoction of *satavari* and *guduchi* is taken. Dosage : 60 ml. 2-3 times daily.
- ⇒ Intake of *satavari* pounded with milk increases breast milk. Dosage: 5-10 gms. twice daily.
- ⇒ *Satavari* taken with milk is also useful in epilepsy, piles, defective vision, dysentry and is used as an

excellent aphrodisiac. Dosage : 60-75 ml. twice daily.

- ⇒ Intake of *satavari* juice mixed with honey relieves burning sensation in the stomach, pain in stomach and other disorders in the body due to *pitta*. Dosage : 10-15 ml., 2-3 times a day.
- ⇒ *Satavari* taken with *ghee* (10-15 gms twice daily) or in the form of decoction (60 ml. two to three times daily) is a good rejuvenative.
- ⇒ *Satavari* along with *vidari* (*Pueraria tuberosa*) is applied externally in some skin disorders due to *pitta*.

- ⇒ In night blindness, tender *satavari* leaves fried in *ghee* should be taken.
- ⇒ To reduce hoarseness of voice, *satavari* mixed with honey and *ghee* is consumed frequently.
- ⇒ Intake of milk or *ghee* cooked with *satavari* and taking bath with the same on every *pushya* star day stabilises the foetus.

“*Satavarex*” is a preparation which only has *Asparagus racemosus*. *Asparagus racemosus* is an ayurvedic formulation of the powder of dried root of medicinal herb- *Asparagus racemosus* with a tasty chocolate flavoured granular form. The remnants of the *Satavari padarth* possess



galactogogic activity possibly through prolactin mediated pathway. Prolactin hormone is secreted as monomeric protein of 198 amino acid residues. Containing 3 disulphide bonds, prolactin has a sequence of asparagine linked glycosylation. Glycosylated prolactin is nearly 25 % as potent hormone since glycosylation stabilises prolactin from degradation. **Satavarex** by virtue of asparagine - one of the chemical constituents may slow down the degradation of the glycosylated prolactin thereby increasing the levels of prolactin.

Thus one can understand how satavari is and can act as a very effective galactogogue .

SATAVARI - A BOON TO THE MOTHER AND CHILD BY NATURE.

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GARLIC AND METHI AS GALACTOGOGUES

- N. Sahani, S. Karande and
- G. Subbulakshmi.

The effect of supplementing lactating women's diet with fenugreek seeds and garlic on the milk yield was studied.

Lactating mothers from the same socio-economic status who had normal delivery were divided into three groups. Each group consisted of 22 subjects. One group left on their usual habituated diet was used as control. The other two experimental groups, E1 and E2 were supplemented with garlic and fenugreek seeds for two months

from the day of delivery. E1 was supplemented with 20 g of garlic chutney and E2 with two ladoos made with 15 g of fenugreek powder per day. The milk yield of mothers of the three groups and the growth rate of the infants were assessed.

The nutrient intake of the mothers was calculated by evaluating their daily dietary record for a period of 3 consecutive days at the time of delivery and thereafter at an interval of 20 days for a period of 2 months.

The milk yield of the mothers was determined by test weighing procedure in which pre and post feeding weights of the child were recorded with the help of baby weighing scale with utmost care taken on the avoidance of excreta being lost during feeding. The difference in weights after each feeding in 24 hours was taken as the milk yield in a day and this was repeated for 3 consecutive days. The anthropometric measurements (height, weight, chest and mid upper arm circumference) were used in assessing the growth rate of the baby.

The study revealed that the nutrient intake of the mothers remained

almost the same in the first 2 months after delivery and there was no difference between the three groups - E1, E2 and C.

On an average the diet provided 80-90% of the recommended allowances for energy for lactating mothers. But with regard to micro-nutrients, the diets were deficient in B-carotene/ Vitamin A, Iron, Calcium and Zinc (Table 1).

The milk yield of the mothers in the control group ranged from 600 to 800 ml. per day after established lactation of 20 days after delivery. The total yield remained the same in the control group of mothers during the study period. On the other hand, there was a significant difference in the milk

yield from the 20th day after delivery to 60th day after delivery in both the experimental groups (Fig 1)

The velocity of growth of infants in terms of weight gain at an interval of 20 days from birth till 2 months of age showed that there was no significant difference between the control and experimental groups. Inspite of measurable improvement in milk yield in the experimental groups as compared to the control group, the associations in terms of corresponding increase in weight (Table 2) was not very strong in the case of E2 (group fed

fenugreek seeds). It is possible that the feeding time is too short to assess the impact of the slight increase observed in the milk yield on the growth pattern. Further, physical growth depends both on the quality and quantity of breast milk available to the baby. This raises the question if methi or garlic improves the quantity of breast milk alone or the quality also.

Hence further studies are needed to be directed towards the nutrient composition of milk secreted by the mothers treated with garlic or methi and those who serve as controls.

Table 1: MEAN NUTRIENT INTAKE OF MOTHERS IN EXPERIMENTAL AND CONTROL GROUPS

NUTRIENT	RDA	BIRTH		20 th DAY		40 th DAY		60 th DAY	
		E	C	E	C	E	C	E	C
Energy (K cal)	2425	1976± 319	2158 ±302	2070 ±210	1940 ±256	2187 ±276	2026 ±357	2217 ±318	2141 ±268
Protein (gm)	75	55.5 ±4.9	53.3 ±5.6	57.8 ±6.2	56.8 ±8.2	57.2 ±5.9	52.6 ±7.8	56.8 ±9.1	55.7 ±5.3
Fat (gm)	45	59.2 ±7.5	54.8 ±16.2	62.7 ±5.9	65.56 ±8.6	63.2 ±6.8	62.27 ±12.2	64.7 ±5.5	59.8 ±11.7
Calcium (mg)	1000	730 ±202	756 ±256	789 ±315	841 ±326	820 ±386	785 ±381	829 ±425	814 ±565
Iron (mg)	30	15.6 ±4.9	12.52 ±4.3	16.85 ±5.2	15.27 ±5.4	16.14 ±5.7	14.18 ±6.1	15.7 ±5.4	14.87 ±3.8
Zinc (mg)	15.5	9.15 ±2.2	8.89 ±3.6	9.32 ±3.2	9.52 ±3.1	7.46 ±4.8	7.43 ±4.2	8.23 ±3.9	7.86 ±3.5
Beta-Carotene (mcg)	3800	1923± 819	1917 ±809	2138 ±809	1965 ±1072	1837 ±920	1863 ±790	1975 ±762	1934 ±943

E = Experimental Group C = Control Group

Note - Values indicate Mean ± S.D

Table 2: BODY WEIGHTS OF INFANTS IN THE CONTROL AND EXPERIMENTAL GROUPS/

Sex	Post-partum period (days)	Body weights of infants (kg)		
		Control	Experimental 1	Experimental 2
Male	At birth	3.21±0.33	2.98±0.32	3.20±0.33
	20	3.60±0.43	3.34±0.36	3.61±0.33
	40	4.18±0.49	4.17±0.39	4.22±0.40
	60	4.87±0.55	4.85±0.56	4.99±0.64
Female	At birth	2.95±0.21	3.11±0.42	2.83±0.18
	20	3.29±0.23	3.43±0.44	3.26±0.19
	40	3.81±0.26	4.23±0.60	3.70±0.19
	60	4.29±0.33	4.82±0.69	4.13±0.24

Figure 1.

**Milk yield of the mothers treated
with garlic or methi seeds**



C = Control

E1 = Experimental 1

E2 = Experimental 2

MODERN DRUGS AND LACTATION

-V. Salvi

Many drugs which are administered to the mother can be detected in breast milk in low levels and are therefore not usually of clinical significance to the infant. However, it would be wise to minimize the use of drugs, while the mother is lactating and try non-pharmacological remedies for minor complaints before resorting to the use of drugs.

The transfer of drugs into breast milk is dependent on a number of factors. Fat soluble drugs pass more easily into breast milk than do water-soluble drugs. Non-ionised molecules

with a low molecular weight are transferred easily as compared to larger molecules. The protein bound fraction of a drug does not pass. Moreover, the concentration of a drug in the foremilk, which contains more water is different from that in the hind milk, which contains more fat (Helsing & King, 1985). The milk : plasma ratio is the level of drug in milk divided by its level in plasma. A drug which is concentrated in milk will have a ratio greater than one.

The level of drug in milk will also depend on the dose ingested by the

mother and will increase if maternal levels of the drug are high due to a maternal overdose or if her renal function is compromised. Generally, approximately 1-2% of the maternal dose is passed on to the neonate and therefore, only sub-therapeutic levels are reached in the neonate (Gabbe et al, 1996). This amount is so insignificant that adverse effects are not observed. A drug may not have any effect because it is not absorbed from the infants gut or it is destroyed by the digestive enzymes of the baby. However, certain drugs are toxic and contra-indicated completely. A drug may affect the baby by:

- its expected pharmacological action,
- A toxic effect due to an overdose,
- interacting with enzyme systems,
- competing for plasma protein binding sites,
- sensitising the infant,
- altering the infantile intestinal flora.

Long term effects of small doses are also not established and sometimes an allergy may arise. Pre-term babies have immature enzyme systems, which may not be able to eliminate a drug quickly. Thus, though the short term use of most drugs possess a very small risk to the neonate, the benefits should be

carefully weighed against the disadvantages.

Many mothers receive a number of drugs for a short period in the immediate postpartum phase and they should be reassured of the negligible effects since colostrum is secreted in very small quantities and therefore, the neonate is exposed to very little concentration of these drugs.

Guidelines for Drugs in Lactation

The American Academy of Paediatrics have reviewed the various drugs, which may be used in lactation.

Drugs contra-indicated in lactation

Cytotoxic agents (Cyclosporine, Doxorubicin, Cyclophosphamide)

Bromocryptine

Ergotamine (only prolonged use is contra-indicated)

Lithium

Amphetamines

Radioactive compounds (require temporary cessation of breast-feeding)

Drugs whose effects are unknown but may be of concern:

Anti-anxiety, anti-depressant and anti-psychotic drugs

Metronidazole

Drugs usually compatible with breast-feeding

Narcotics, Sedatives, Anticonvulsants (Mothers on benzodiazepines or barbiturates should observe the baby for sedation)

Analgesics (only very high doses of salicylates are contraindicated)

Antihistamines and Phenothiazines

Aminophylline

Antihypertensives

Anticoagulants (heparin is safe while mothers on warfarin should have monitoring of maternal and infant prothrombin time)

Corticosteroids

Digoxin

Antibiotics (sulphonamides should not be used in the first five postpartum days or with preterm deliveries)

Oral Contraceptives (reduce the quantity of breast-milk but no other adverse effects noted)

Alcohol (occasional ingestion permitted)

Propylthiouracil

Caffeine

If there is concern about drug levels in the neonate, a mother who is on any long term therapy should ingest the drug after nursing to minimize the blood levels in the neonate.

Suppression of Lactation

In those patients who require suppression of lactation, drugs are routinely advised. Estrogens, bromocryptine or high doses of pyridoxine have all been used. However, estrogens have their own adverse effects and the Food and Drug Administration of the United States no longer approves of bromocryptine for lactation suppression in view of the high incidence of side effects. Therefore, drugs should be used with caution. However, breast support, ice-packs, and analgesic medications are helpful for treating breast engorgement and milk production stops within a few days. Milk expression should be

avoided, leading to suppression of prolactin secretion and subsequent breast involution.

Lactation Failure

Lactation failure is encountered occasionally in patient. Reassurance and counselling of the patient and her relatives is extremely important. Lactation failure is usually overcome by decreasing the interval between feeds and by encouraging milk let-down by the use of nasal oxytocin sprays, if available. Pharmacological enhancement of milk secretion can be achieved by the use of metoclopramide. Metoclopramide blocks dopamine receptors and

stimulates prolactin secretion and should be used in a dose of 10mg three or four times a day.

In conclusion, drugs should be used sparingly during lactation and the benefits of use should be balanced against the adverse effects. However, most drugs can be safely utilised for short periods of time and the mothers need to be reassured about the same.

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CUES AND QUERIES ON LACTATION

- G. Subbulakshmi & A. Hegde.

“The first days after delivery is an interesting tangle of conflicting feelings - elation and overwhelming pride of being a mother, anxiety, exhaustion and confidence”. Nothing can really prepare you for the reality of breast feeding your baby. You have so much to learn as to how to feed and nourish your baby.

This section gives you a few helpful tips to clarify some of your questions that have been bothering you.

1. There was no milk on the 1st day after delivery. I thought I can never breast feed my baby.

Milk secretion may not occur for the first two days after birth simply because the baby does not need it. Unfortunately, some of the doctors who are not aware of this fact may insist on prelacteal feed such as honey and water and sugar and water. However, it is now well established that nature knows the needs of the new-born. Hence relax and wait for the nature to work.

2. First milk is very thick and slimy. How can the child digest or suckle it?

The first milk known as colostrum is light yellow coloured fluid which contains water, protein and minerals in right proportions to take care of your baby's nutritional needs. It is also rich in valuable antibodies which protects your baby against diseases. It works as a laxative and helps in bowel movement.

SO FEED YOUR CHILD WITH COLOSTRUM.

3. I get strong pangs of thirst as I breast feed my child. If I drink water, will it dilute the milk?

It is important to have plenty of water during lactation. To the extent possible nature gives priority to the baby's needs and as such maintains the quality of milk even if the mother is dehydrating. Similarly, if the mother has excess of water, the extra water only gets excreted through urine but does not affect the quality of milk.

4. "I am breast feeding my baby, do I still have to use a contraceptive?"

Fully breast-feeding women may not conceive, and this is considered as an effective method of family planning by experienced grandmothers. But bear in mind

that intercourse is also often not advised by grandmothers during lactation. While there is no worry in using physical method of contraception, it is better to consult your doctor for oral contraceptives during lactation.

5. Is it true that women with larger breast are able to produce more milk as compared to women with smaller breasts?

Secretion of milk does not depend on the breast size. The size of the breast is just a reflection of the fat content of the breast.

6. Can baby's water consumption influence milk intake?

Not really, the baby can discriminate between milk and water and chooses as per the needs. It is observed that if the baby is really thirsty, then the breast is rejected and the water bottle is grabbed.

7. Past few days I have been observing that my child cries even after the feed. I wonder if it could be due to insufficiency of milk. Is there any food which can help increase the flow of milk?

Yes, there are indeed few food items that have been proved to be beneficial in improving the milk quantity and quality. Garlic, methi seeds and satavari fall in these lines. "Satavarex" is an ayurvedic preparation that is available in the market. Methi ladoo and garlic chutney can easily be made from your own kitchen.

8. *My child is 8 months now, and I want to stop breast feeding my child. However, he is not leaving the breast inspite of having adequate top milk outside and food. What can be done about it? How do I solve this problem.*

There are food materials/herbs that are used externally as an application on the breast. For instance, 'jaiphal' can be ground and then mixed with milk to form a paste and applied on the nipples before feeding. This application acts as an aversive stimuli for the child and hence stops longing for breast milk.

9. *I get hunger pangs during breast feeding. Is it something abnormal?*

If you are feeding the baby with empty stomach it is of course normal for your body to react to its needs. This is the reason the grandmothers used to insist on having food before feeding the baby.

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Dr. G. Subbulakshmi
Archana V. Hegde



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